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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/671,358	09/25/2003	David Callum Johnson	S1011/20159	7092

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CAESAR, RIVISE, BERNSTEIN,
COHEN & POKOTILOW, LTD.
11TH FLOOR, SEVEN PENN CENTER
1635 MARKET STREET
PHILADELPHIA, PA 19103-2212

EXAMINER

BUTLER, DOUGLAS C

ART UNIT	PAPER NUMBER
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3683

DATE MAILED: 05/26/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/671,358

Applicant(s)

JOHNSON, DAVID CALLUM

Examiner

Douglas C. Butler

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 February 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) 10-14 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 and 15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 1-15 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

Detailed Action

1. An action on the merits of claims 1-9 and 15 readable on the elected invention is included in this office action with claims 10-14 withdrawn from consideration under 37 CFR 1.142(b) as not being readable on the elected invention. Group I and III have been combined into a single elected invention, election having been made without traverse.
2. The search reports and submitted prior art have been considered.
3. Fig. 1 should be labeled as "Prior Art."
4. **INFORMATION ON HOW TO EFFECT DRAWING CHANGES**

Replacement Drawing Sheets

Drawing changes must be made by presenting replacement sheets which incorporate the desired changes and which comply with 37 CFR 1.84. An explanation of the changes made must be presented either in the drawing amendments section, or remarks, section of the amendment paper. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). A replacement sheet must include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of the amended drawing(s) must not be labeled as "amended." If the changes to the drawing figure(s) are not accepted by the examiner, applicant will be notified of any required corrective action in the next Office action. No further drawing submission will be required, unless applicant is notified.

Identifying indicia, if provided, should include the title of the invention, inventor's name, and application number, or docket number (if any) if an application number has not been assigned to the application. If this information is provided, it must be placed on the front of each sheet and within the top margin.

Annotated Drawing Sheets

A marked-up copy of any amended drawing figure, including annotations indicating the changes made, may be submitted or required by the examiner. The annotated drawing sheet(s) must be clearly labeled as "Annotated Sheet" and must be presented in the amendment or remarks section that explains the change(s) to the drawings.

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Timing of Corrections

Applicant is required to submit acceptable corrected drawings within the time period set in the Office action. See 37 CFR 1.85(a). Failure to take corrective action within the set period will result in ABANDONMENT of the application.

If corrected drawings are required in a Notice of Allowability (PTOL-37), the new drawings MUST be filed within the THREE MONTH shortened statutory period set for reply in the "Notice of Allowability." Extensions of time may NOT be obtained under the provisions of 37 CFR 1.136 for filing the corrected drawings after the mailing of a Notice of Allowability.

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1, 3, 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Smith et al (US 6,174,594) for the reasons set forth in the British Search Report.

8. Claims 1, 2, 3, 15 are rejected under 35 U.S.C. 102(b) as being anticipated by GB 2298687 to Fennell et al or Purdy et al (US 6057022), for the reasons set forth in the British Search Report.

9. Claims 1-9 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krenkel et al (935) or Bauer et al (040) or Domergue et al (475) or Martin (164) in view of GB 2298687 to Fennell et al or Purdy (022) or Dietrich et al (525).

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It would have been obvious at the time the invention was made to select the density of the core to wear layer in each of the principal references to be with the core density 1.85 gcm^{-3} to 2.95 gcm^{-3} and the wear layer(s) 1.85 gcm^{-3} or lower as taught by each of the secondary references to reduce weight and costs to compensate for the squeezed profit margins in businesses today by routine trial and error which leads to optimum ranges without sacrificing the brakes ability to operate within acceptable wear frames and weight and heat concerns. See the entire disclosure of Dietrich et al (525) that discusses reducing wear layer density relative to a brake disc core. One having ordinary skill in the art recognizes that lowering the density of the wear layer to be too low relative to the core's density would be unacceptable if its wear properties are no longer sufficient to ensure an extended wear life with good heat reduction.

10. Claims 1-9 and 15 are rejected under 35 U.S.C. 103 as being unpatentable over the prior art statements or admissions set forth in the instant specification and instant Fig. 1, admitted prior art, in view of GB 2298687 to Fennell et al or Purdy et al (022) or Dietrich et al (525).

The specification on page 2, paragraph 3 states that:

☞ "Carbon-carbon composite (C-C) brake discs have become established as the material of choice⁴ for aircraft multi-disc brake systems where their relatively high cost is justified by their relatively lower weight compared with the metallic alternative. The high specific heat of carbon allows large quantities of energy to be absorbed by a low brake heat-pack mass during braking."

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The instant specification further states on page 2, the last two paragraphs that the typical density of the core is $1.6-1.85 \text{ gcm}^{-3}$ although higher density cores in the range of $1.9-2.2 \text{ gcm}^{-3}$ are used wherein the density has been increased by infiltrating the C-C brake disc with molten silicon which improves the friction properties of the disc core.

Page 2, the second full paragraph states:

"Although a C-C brake heat-pack offers significant weight reduction compared with the metallic alternative, the relatively lower density of C-C (typically in the region of $1.6-1.85 \text{ gcm}^{-3}$) means the C-C brake heat-pack occupies a volume that ..."

Page 2, the last full paragraph states that:

"In the past, C-C brake discs have been infiltrated with molten silicon and heat treated to react at least some of the silicon with the carbon of the matrix to form silicon carbide which improves the friction properties of the so-formed disc. Such materials are known to have a higher density than the C-C of the 'base' disc, the density of the siliconised material being typically in the range $1.9-2.2 \text{ gcm}^{-3}$. However, the wear rate of such siliconised brake discs is typically significantly higher than that of a corresponding C-C disc thus requiring a longer heat-pack of higher density and thereby increasing overall weight of the wheel and brake."

The difference between the prior art and the instant claims in summary appears to be selecting the density of the wear layer to be less than the density of the core which is taught by Fennell et al and Purdy et al with the references further teaching the specific ranges.

It would have been obvious at the time the invention was made to modify the admitted prior art to select the core layer to have a greater density than the wear layer with the specific ranger taught by Fennell et al or Purdy or Dietrich et al in order to reduce costs and it would have been obvious to the artisan in the art to manipulate the ratios of density, lengths, sizes, etc., as taught by the secondary references and, in the alternative, to select the specific ranges through routine trial and error during routine experimentation to select the optimum ranges to arrive at the best and most cost effective solution to promote strength, good wear capabilities, good heat reduction and weight concerns.

11. It is unclear why claim 15 is presented for examination due to its undue breadth, its lack of material details and clear unpatentability. Reconsider the submitted Search Reports from an objective viewpoint noting that applicant should avoid submitting claims clearly not commensurate with applicant's contribution in the art since to do so fails to advance the prosecution in a reasonable manner and time. The examiner suggests that applicant cancel claims 1-9, 15 replacing same with a single independent including all features of the rejecting claims and submit an affidavit establishing that the materials used and density claimed to be critical with advantages over the prior art.

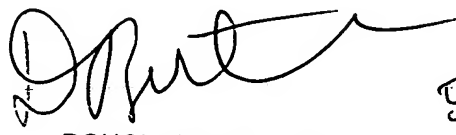
12. Note Hubbard et al (592) Scaringella et al (717) Hecht et al (058), Prunier, Jr. et al (849), Stover (709), Rudoph et al (297), Clark et al (562), Lau et al (154) and Murdle et al (160).

13. Johnson (990), not prior art in this application, is cited to complete the record.

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14. Any inquiry concerning this communication should be directed to Exmr Butler at telephone number 571-272-7115.

Butler/vs
May 23, 2005

 5/25/05
DOUGLAS C. BUTLER
PRIMARY EXAMINER
AU 3683